North Ridge Estates

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Asbestos Site Evaluation, Communicaiton and Cleanup

Keystone, Colorado
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Site Background
Overview

- 1944 – Marine Recuperation Barracks constructed
- 1946 – the property is transferred to the State of Oregon for the Oregon Institute of Technology Campus
- 1966 – OIT relocates to another site, the property is sold into private ownership
- 1966 to mid 1970's – vacant buildings stripped of salvageable materials such as copper, metals and wood, and some vacant buildings are demolished
- 1977 - MBK partnership purchases the site, demolishes the remaining buildings and subdivides the site into residential lots



Site Background
Overview

- 1979 – EPA issues order for cleanup and disposal of asbestos contamination and specifies deed restrictions for affected lots
- 1993 – USACE visits the site and reports on burial sites for ACM, but gave site a NFA letter and removed it from FUDS list
- 1990's – 22 homes built by MBK partnership
- July 2001 – DEQ responds to complaint about contamination
- 2002 - DEQ asbestos survey and finds ACM on over 50 of the 81 acres surveyed



Site Background
Overview

- June 2002 – DEQ enters cleanup agreement with MBK, 50 tons of ACM is collected and disposed of off-site
- January 2003 – ODHS issues preliminary health consultation
- March 2003 – ODHS/DEQ determines a significant public health hazard exists from asbestos exposure
- April 2003 – DEQ refers NRE to the EPA emergency response program
- May 2003 – AOC signed
- Currently – surface cleanup completed, air monitoring completed, soil sampling ongoing, analysis ongoing



Site Background
Geography/Affected Area

- North Ridge Estates is located in South Central Oregon in a high desert area (el. 4,500 feet)
- Sparsely vegetated with some scattered ponderosa pines and sagebrush
- Volcanic soil, rocky in places
- Relatively dry climate, annual average rainfall is 13 inches
- No surface water present, groundwater is at 350 - 450 feet BGS, residents on city water



Site Background
Population Affected

- 63 residents, including 26 children (10 ages 6 and under)
- 22 homes, nine vacant home sites in the main area of investigation
- Investigation is expanding to evaluate 16 homes and a 4-plex apartment building east of Old Fort Road



Site Background
Clashing Viewpoints

- Some residents want the site cleaned up so they can stay on their property and enjoy it without fear of risk to their health from asbestos fibers.
- Some residents want to move elsewhere because they have lost the enjoyment and ability to be safe in their homes. They either want the site cleaned up so their property can be sold at a fair market price or be compensated for the value of their property so they can move elsewhere.
- A few people remain neutral and will watch cleanup efforts at the site.



Site Background
Mineral Forms of Asbestos*

- Concrete Asbestos Board (CAB): 25% asbestos (mostly chrysotile)
- Vinyl Floor Tiles (VAT): 6-7% asbestos
- Roofing Material: 30% asbestos (chrysotile and amosite)
- Steam Pipe Insulation: 45% asbestos (amosite and chrysotile)

* Based on earlier studies conducted by ODEQ



Site Background
Asbestos-Related Health Effects

- One of the people who worked with the developer to demolish the buildings has been diagnosed with respiratory disease
- Ongoing exposures to residents who live on the properties, including small children
  - Inhalation
  - Direct Contact

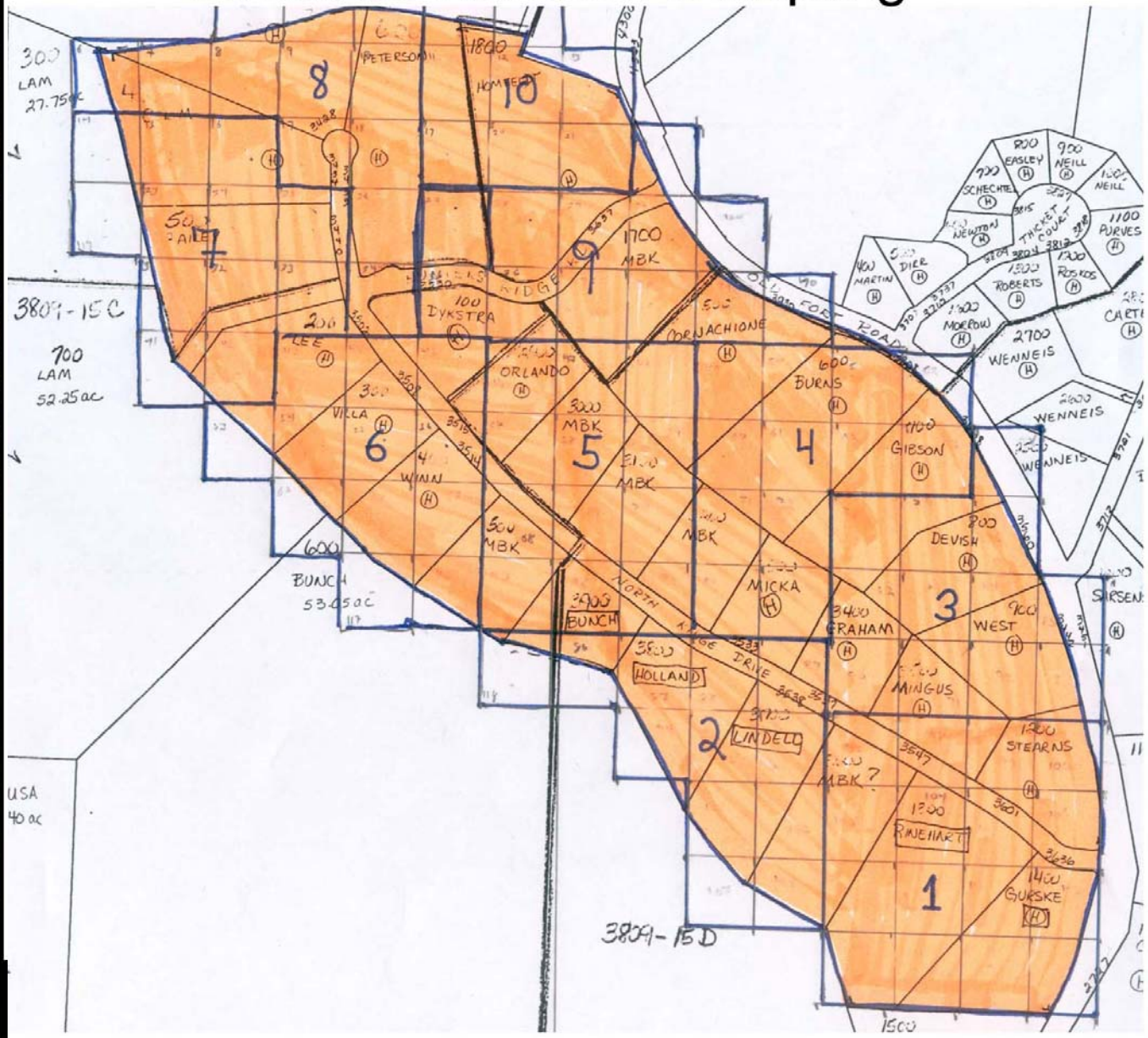


ACTIVITIES BY EXPOSURE PATHWAY – Soil Sampling (Baseline and Hot Spots)

- Berman's Bulk Soil Method: Soil samples are run through an elutriator (20% may be run using Januch glove box method)
- Site was divided into 120 equal area squares, one sample was taken from each grid, 10 composites were generated from 12 component samples
- Additionally, "hot spots" were included as discrete samples



Figure 3:
Example Scheme for
Stratified-Random Sampling



ACTIVITIES BY EXPOSURE PATHWAY – SOIL Sampling (conclusion)

- EPA and Other Agencies do not agree with the idea of using composite samples to assess risks to current residents; however, a goal of this sampling is to derive a relationship between ACM in soil and fibers in soil. This goal is worthwhile; however, much ACM had been removed prior to this removal action investigation so we may have questions about the validity of observed correlations.



ACTIVITIES BY EXPOSURE PATHWAY – SOIL Analysis (Baseline and Hot Spots)

- Mineralogic Asbestos Evaluation will be ascertained from TEM
- Dr. Berman recommended counting only “protocol structures” and PCME; 20% of samples all fibers will be counted (Dr. Berman argued that there are no standards to evaluate “all fibers”)
- EPA will get duplicate filters from every elutriator sample
- Cleavage Fragments were not specifically addressed, rather all structures meeting size requirements were counted



ACTIVITIES BY EXPOSURE PATHWAY – SOIL Analysis (cont)

- Estimated Sensitivity to Methods: Target concentrations should be about 2 million structures/g PM_{10}
- Results are expected within a month???



ACTIVITIES BY EXPOSURE PATHWAY – SOIL Sampling (Residential Lots)

- To address our concern that composites were not appropriate for assessing risks to current residents, samples were collected from each lot
- Januch's Glove Box Method: Soil samples will be agitated in a glove box, air sample is collected
- At each residence, 10 locations were identified that correspond to historical ACM locations, high use areas, and other criteria. Samples from each locations were composited to form a single sample at each residence.



ACTIVITIES BY EXPOSURE PATHWAY – SOIL

Sampling (conclusion)

- ODHS and ATSDR do not agree that composites should be used to assess residential risks. Therefore, at 25% of residences, subsamples will be archived for later analysis, depending on results.



ACTIVITIES BY EXPOSURE PATHWAY – SOIL Analysis (Baseline and Hot Spots)

- Mineralogic Asbestos Evaluation will be ascertained from TEM
- ISO 10312 will be used to count all fibers (short and thick fibers missed by counting “protocol” structures
- Polarized Light Microscopy (PLM): At each residence, a subsample from the composite sample will be analyzed by PLM. Because this method is relatively cheap, this analysis will be done at each residence. (Note: only structures thicker than 1 micron are counted)
- Cleavage Fragments were not specifically addressed



ACTIVITIES BY EXPOSURE PATHWAY – SOIL Analysis (cont)

- Results from the glove box samples are not anticipated until early in 2004
- PLM results should be available relatively quickly



ACTIVITIES BY EXPOSURE PATHWAY – DUST Sampling

- Dust sampling will be performed within each residence; however, Dr. Berman requested additional time to develop an appropriate method. He does not think the ASTM method should be used because there is no way to interpret the results.
- At least one dust sample will be collected at each residence



ACTIVITIES BY EXPOSURE PATHWAY – AIR Sampling

- Concurrent indoor and outdoor air samples were collected at each residence
- 2 L/minute, 24 hours sample duration at each residence (2,880 liters)
- First round of 8 houses: duplicate samples from PBS for all samples
- Subsequent rounds: 2 of every 8 indoor/outdoor pairs have EPA-collected duplicates
- Ambient samples also have been collected by EPA



ACTIVITIES BY EXPOSURE PATHWAY – AIR

Sampling (conclusion)

- EPA's START contractor uses different pumps than PBS, but both are calibrated at same flow rate
- EPA/START pumps have crashed, but have timers so volume estimates can still be obtained
- First week, sprinklers came on at some houses, field crew wised up!



Activities By Exposure Pathway – AIR Analysis

- Mineralogic Asbestos Evaluation will be done by TEM
- PBS sample analysis will be consistent with soil baseline elutriator samples: all samples will be analyzed by TEM to count “protocol structures” and PCME; 20% of samples will have all ISO structures counted
- EPA duplicate samples will by analyzed using ISO 10312



Activities By Exposure Pathway – AIR Analysis (cont)

- Minimum analytical sensitivity should be about 1 x 10^{-4} structures/cm^3
- Results should be available within a month
- Preliminary results for ambient samples are primarily non-detects
- Personnel monitors met OSHA requirements



ACTIVITIES BY EXPOSURE PATHWAY – AIR Analysis (conclusion)

- Additional air data may be collected to assess personal exposures during simulated activities at one currently unoccupied residence
- The plan for this activity has not yet been developed



ACTIVITIES BY EXPOSURE PATHWAY –

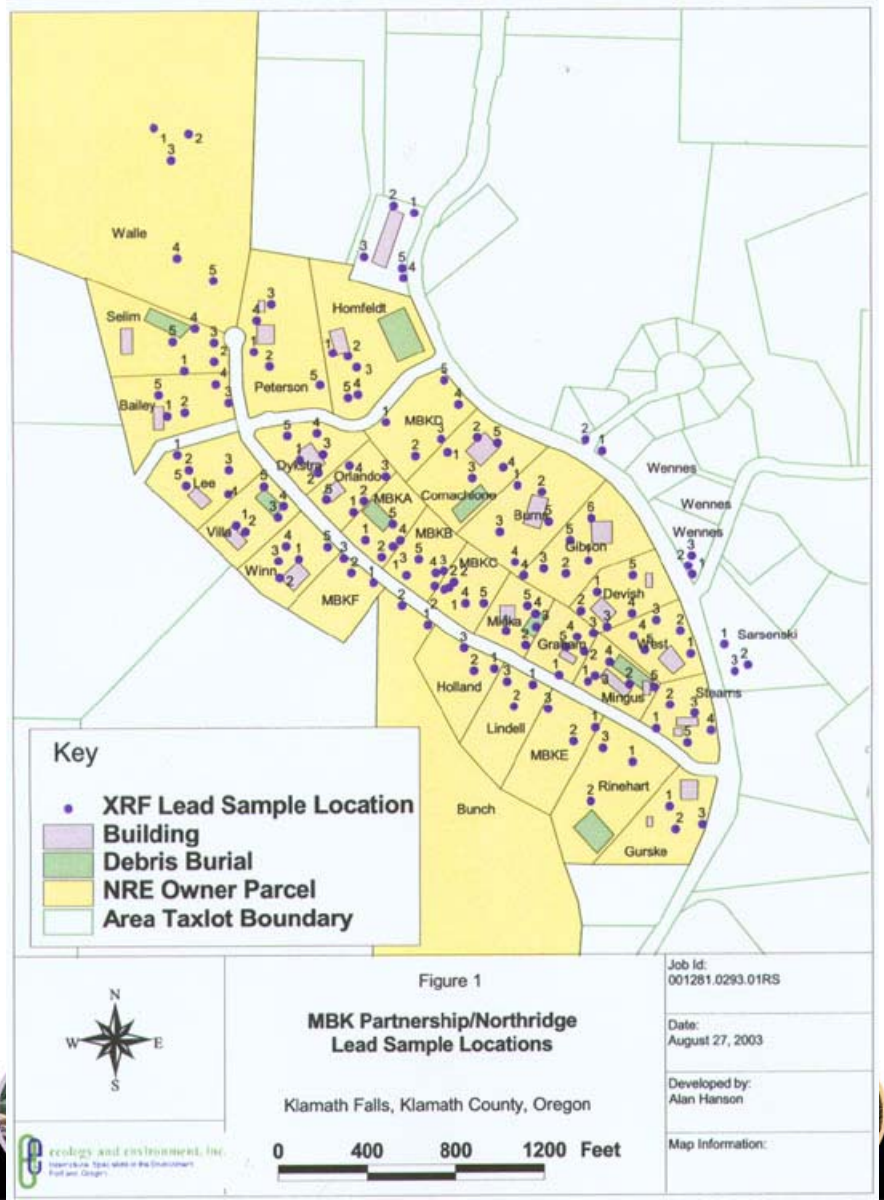
Other Contaminants Sampling

- Areas observed to have high levels of ACM on the surface were analyzed for arsenic and lead in the field using XRF
- Locations of samples are shown on the following figure
- A subset of samples was sent for confirmation analysis to a fixed lab



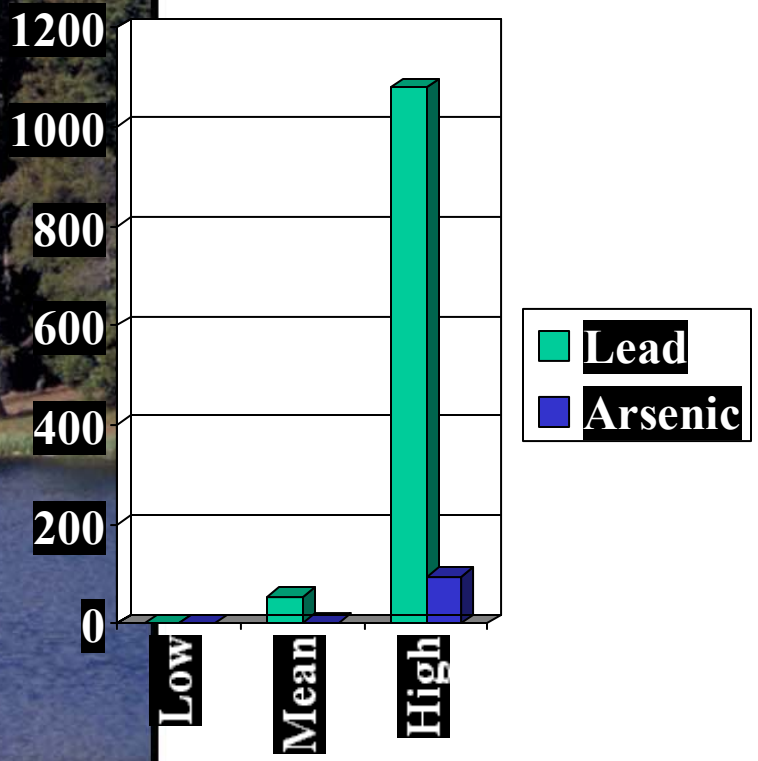
ACTIVITIES BY EXPOSURE PATHWAY

Other Contaminants



ACTIVITIES BY EXPOSURE PATHWAY

Other Contaminants Results



- 168 samples were analyzed for lead and arsenic using XRF
- Lead: 82 detects (2 locations > 400 ppm)
- Arsenic 5 detects (two locations > 20 ppm, but less than 100 ppm)

Site Remedial Actions – Actions Completed

- Since June of this year, an additional 11,000 pounds of ACM has been removed from residential properties
- “Hot spots” have been identified at 10 properties
- Burial pits have been identified on 14 properties



Site Remedial Actions – Ongoing Site Plans

- Once data are QA'd, EPA will work with other state and Federal agencies to develop a unified message
- Baseline soil samples may indicate that the problem is bigger than we expected, in which case interim removal/remedial activities may be warranted



Site Remedial Actions – Ongoing Site Plans

- Similarly, air samples may indicate the need for interim removal/remedial actions or relocations
- A comparison of PLM to glove box to Berman methods will be very interesting




Best Western